

**AMENDMENTS TO THE CLAIMS**

Please amend claims 1, 6-11, 14-20 and 22, and cancel claims 2-5, 12, 13 and 21, as set forth in the listing of claims that follows:

1. (Currently Amended) A diagnostic testing system for a vehicle comprising  
~~an oxygen sensor comprising:~~
- ~~an oxygen sensor;~~
  - an analyzer having a user interface;
  - a communications link between said analyzer and said vehicle to obtain data from said oxygen sensor and engine throttle position obtained generally concurrently with said data from said oxygen sensor, said data from said oxygen sensor includes a voltage between an upper voltage and a lower voltage in a generally sinusoidal manner over time;
  - a diagnostic heuristic to analyze said data and confirm proper operation of said sensor, said diagnostic heuristic comprising correlating engine throttle position with said data from said oxygen sensor over said time period and measuring a  
<sup>first</sup> time period between said upper voltage and said lower voltage; and
  - an output generated by said diagnostic heuristic to said user interface including the results generated by said diagnostic heuristic.

2-5. (Cancelled)

6. (Currently Amended) A diagnostic testing system as in claim 13, wherein a cross-count voltage is established between said upper voltage and said lower voltage, and wherein a <sup>second</sup> time period is set and the number of counts measured where said voltage matches said cross-count voltage within said <sup>second</sup> time period.

7. (Currently Amended) A diagnostic testing system as in claim 6, ~~wherein said~~ <sup>further</sup> data includes engine RPM obtained generally concurrently with said data from said oxygen sensor such that said engine RPM can be correlated with said data from said oxygen sensor over said <sup>second</sup> time period.

8. (Currently Amended) A diagnostic testing system as in claim 12, wherein said data is collected over a predetermined time for use by said diagnostic heuristic.

9. (Currently Amended) A diagnostic testing system as in claim 12, wherein said diagnostic heuristic includes a set of instructions presented through said user interface.

10. (Currently Amended) A diagnostic testing system as in claim 9, wherein a ~~first~~ said set of instructions includes pre-validation system check.

11. (Currently Amended) A diagnostic testing system for a running vehicle having an internal combustion engine and an oxygen sensor received within to an exhaust stream of said internal combustion engine, comprising:

~~an oxygen sensor received within the exhaust stream of the vehicle;~~

an analyzer having a user interface;

a communications link between said analyzer and said vehicle to obtain data from said oxygen sensor, and wherein said data from said oxygen sensor includes a voltage, said voltage ranging between an upper voltage and a lower voltage in a generally sinusoidal <sup>manner</sup> ~~manner over a time period;~~

a diagnostic heuristic to analyze said data and confirm proper operation of said sensor, said diagnostic heuristic ~~using said voltage in combination with said time period to analyze said sensor~~ comprising a first test to measure a first time period between said upper voltage and said lower voltage and to determine whether said first time period is within a pre-set threshold and, if said first time period is within said pre-set threshold, a second test to establish a cross-count voltage between said upper voltage and said lower voltage and to determine a number of counts where said voltage matches said cross-count voltage within a second time period such that said sensor passes a second test if said number of counts is within <sup>said</sup> a pre-set threshold; and

an output generated by said diagnostic heuristic to said user interface.

12-13. (Cancelled)

14. (Currently Amended) A diagnostic testing system as in claim 11 ~~13~~, wherein prior to said first test, said system includes pre-test validation, said pre-test validation including confirming sensor communication; module indicator light and diagnostic trouble code analysis; engine RPM; and sensor temperature.

15. (Currently Amended) A diagnostic testing system as in claim 14, wherein said sensor temperature is determined as a function of coolant temperature.

16. (Currently Amended) A method for diagnostic testing of an oxygen sensor within a vehicle, the method comprising:

configuring a user interface in communication with a software system;

configuring a communications link in communication with said software system;

said software system communicating with <sup>said</sup> ~~an~~ oxygen sensor;

conducting a pre-validation test using said software system; and

conducting a diagnostic test of said oxygen sensor using said software

system, said diagnostic test comprising correlating engine throttle position with ~~said~~ data from said oxygen sensor and measuring a first time period between an upper voltage and a lower voltage, and wherein said diagnostic test further includes the steps of:

setting a cross-count voltage;

determining a cross count value for said oxygen sensor based upon the number of times said voltage crosses said cross-count voltage over <sup>first</sup> ~~said~~ time period; and

comparing said cross count value to a pre-set threshold to confirm operation of said sensor.

17. (Currently Amended) The method of claim 16, wherein said pre-validation test further includes configuring an interface between said software system and an on-board vehicle computer system and testing ~~conducting a pre-validation test~~ for stored trouble codes in said on-board vehicle computer system.

18. (Currently Amended) The method of claim 16, wherein said pre-validation test further includes configuring an interface between said software system and an on-board vehicle computer system and testing ~~conducting a pre-validation test~~ for sensor temperature.

19. (Currently Amended) The method of claim 16, wherein said pre-evaluation test includes determining ~~reading of~~ sensor temperature ~~uses~~ using engine coolant temperature.

20. (Currently Amended) The method of claim 16, wherein said diagnostic testing of said oxygen sensor further includes collecting a plurality of voltage readings of said oxygen sensor over a set time period.

21. (Cancelled)

22. (Currently Amended) A method of claim 20, wherein said diagnostic testing of said oxygen sensor further includes the steps of:

~~establishing an upper voltage and a lower voltage;~~

measuring the time for said voltage to move <sup>from</sup> ~~between one of~~ said upper voltage  
to ~~and~~ said lower voltage <sup>from</sup> ~~or~~ said lower voltage <sup>to</sup> ~~and~~ said upper voltage ~~and the other~~  
~~of said upper voltage and said lower voltage; and~~

comparing the time to a pre-set threshold to confirm operation of said sensor.

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